(d) An expression may contain any sequence of constants, variables and operators.
(e) Operators having equal precedence are evaluated using associativity.
(f) Left to right associativity means that the left operand of a operator must be unambiguous whereas right to left associativity means that the right operand of a operator must be unambiguous.
(g) Input/output in C can be achieved using **scanf( )** and **printf( )** functions.

Exercise

[A] Which of the following are invalid variable names and why?

BASICSALARY	_basic	basic-hra
#MEAN	group.	422
population in 2006	over time	mindovermatter
FLOAT	hELLO	queue.
team'svictory	Plot # 3	2015_DDay

[B] Point out the errors, if any, in the following C statements:

(a) int = 314.562 * 150 ; <--- missing variable Name

(b) name = 'Ajay' ; <--- should be name[] = "Ajay"

(c) varchar = '3' ;

(d) 3.14 * r * r * h = vol_of_cyl ; <--- Assignment should be on left

(e) k = (a * b) (c + (2.5a + b) (d + e) ;<--- missing operators between ()here()

(f) m_inst = rate of interest * amount in rs ; <--- invalid variable names on right side

(g) si = principal * rateofinterest * numberofyears / 100 ;

(h) area = 3.14 * r ** 2 ; <--- Wrong operator (**)

(i) volume = 3.14 * r ^ 2 * h ; <--- wrong operator ^

(j) k = ((a * b) + c) (2.5 * a + b) ; <--- operator missing between parentheses

(k) a = b = 3 = 4 ;

(l) count = count + 1 ;

(m) date = '2 Mar 04' ; <--- '' are for character "" is for strings

[C] Evaluate the following expressions and show their hierarchy.

(a) g = big / 2 + big * 4 / big - big + abc / 3 ;
(abc = 2.5, big = 2, assume **g** to be a float)

(b) on = ink * act / 2 + 3 / 2 * act + 2 + tig ;
(ink = 4, act = 1, tig = 3.2, assume **on** to be an int)

(c) s = qui * add / 4 - 6 / 2 + 2 / 3 * 6 / god ;
(qui = 4, add = 2, god = 2, assume **s** to be an int)

(d) s = 1 / 3 * a / 4 - 6 / 2 + 2 / 3 * 6 / g ;
(a = 4, g = 3, assume **s** to be an int)

[D] Fill the following table for the expressions given below and then evaluate the result. A sample entry has been filled in the table for expression (a).

Operator	Left	Right	Remark
/	10	5 or 5 / 2 / 1	Left operand is unambiguous, Right is not
..	..	..	..

(a) g = 10 / 5 /2 / 1 ;

(b) b = 3 / 2 + 5 * 4 / 3 ;

(c) a = b = c = 3 + 4 ;

[E] Convert the following equations into corresponding C statements.

(a) $Z = \frac{8.8(a+b)2/c-0.5+2a/(q+r)}{(a+b)*(1/m)}$

(b) $X = \frac{-b+(b*b)+2\ 4ac}{2a}$

(c) $R = \frac{2v+6.22\ (c+d)}{g+v}$

(d) $A = \frac{7.7b\ (xy+a)/c-0.8+2b}{(x+a)\ (1/y)}$

[F] What would be the output of the following programs:

(a)
```
main( )
{
```

```
        int   i = 2, j = 3, k, l ;
        float   a, b ;
        k = i / j * j ;
        l = j / i * i ;
        a = i / j * j ;
        b = j / i * i ;
        printf( "%d %d %f %f", k, l, a, b ) ;
    }

(b) main( )
    {
        int  a, b ;
        a = -3 - - 3 ;
        b = -3 - - ( - 3 ) ;
        printf ( "a = %d b = %d", a, b ) ;
    }

(c) main( )
    {
        float a = 5,  b = 2 ;
        int c ;
        c = a % b ;
        printf ( "%d", c ) ;
    }

(d) main( )
    {
        printf ( "nn \n\n nn\n" ) ;
        printf ( "nn /n/n nn/n" ) ;
    }

(e) main( )
    {
        int a, b ;
        printf ( "Enter values of a and b" ) ;
        scanf ( " %d %d ", &a, &b ) ;
        printf ( "a  = %d b = %d", a, b ) ;
    }
```

(f)
```
main( )
{
    int p, q ;
    printf ( "Enter values of p and q" ) ;
    scanf ( " %d %d ", p, q ) ;
    printf ( "p  = %d q =%d", p, q ) ;
}
```

[G] Pick up the correct alternative for each of the following questions:

(a) C language has been developed by
(1) Ken Thompson
(2) Dennis Ritchie
(3) Peter Norton
(4) Martin Richards

(b) C can be used on
(1) Only MS-DOS operating system
(2) Only Linux operating system
(3) Only Windows operating system
(4) All the above

(c) C programs are converted into machine language with the help of
(1) An Editor
(2) A compiler
(3) An operating system
(4) None of the above

(d) The real constant in C can be expressed in which of the following forms
(1) Fractional form only
(2) Exponential form only
(3) ASCII form only

(4) Both fractional and exponential forms

(e) A character variable can at a time store
(1) 1 character
(2) 8 characters
(3) 254 characters
(4) None of the above

(f) The statement **char ch = 'Z'** would store in **ch**
(1) The character Z
(2) ASCII value of Z
(3) Z along with the single inverted commas
(4) Both (1) and (2)

(g) Which of the following is NOT a character constant
(1) 'Thank You'
(2) 'Enter values of P, N, R'
(3) '23.56E-03'
(4) All the above

(h) The maximum value that an integer constant can have is
(1) -32767
(2) 32767
(3) 1.7014e+38
(4) –1.7014e+38

(i) A C variable cannot start with
(1) An alphabet
(2) A number
(3) A special symbol other than underscore
(4) Both (2) & (3) above

(j) Which of the following statement is wrong
(1) mes = 123.56 ;
(2) con = 'T' * 'A' ;
(3) this = 'T' * 20 ;
(4) 3 + a = b ;

(k) Which of the following shows the correct hierarchy of arithmetic operators in C
   (1) **, * or /, + or -
   (2) **, *, /, +, -
   (3) **, /, *, +, -
   (4) / or *, - or +

(l) In b = 6.6 / a + 2 * n ; which operation will be performed first?
   (1) 6.6 / a
   (2) a + 2
   (3) 2 * n
   (4) Depends upon compiler

(m) Which of the following is allowed in a C Arithmetic instruction
   (1) [ ]
   (2) { }
   (3) ( )
   (4) None of the above

(n) Which of the following statements is false
   (1) Each new C instruction has to be written on a separate line
   (2) Usually all C statements are entered in small case letters
   (3) Blank spaces may be inserted between two words in a C statement
   (4) Blank spaces cannot be inserted within a variable name

(o) If a is an integer variable, a = 5 / 2 ; will return a value
   (1) 2.5
   (2) 3
   (3) 2
   (4) 0

(p) The expression, a = 7 / 22 * (3.14 + 2) * 3 / 5 ; evaluates to

(1) 8.28
(2) 6.28
(3) 3.14
(4) 0

(q) The expression, a = 30 * 1000 + 2768 ; evaluates to
(1) 32768
(2) -32768
(3) 113040
(4) 0

(r) The expression x = 4 + 2 % - 8 evaluates to
(1) -6
(2) 6
(3) 4
(4) None of the above

(s) Hierarchy decides which operator
(1) is most important
(2) is used first
(3) is fastest
(4) operates on largest numbers

(t) An integer constant in C must have:
(1) At least one digit
(2) Atleast one decimal point
(3) A comma along with digits
(4) Digits separated by commas

(u) A character variable can never store more than
(1) 32 characters
(2) 8 characters
(3) 254 characters
(4) 1 character

(v) In C a variable cannot contain
(1) Blank spaces

(2) Hyphen
(3) Decimal point
(4) All the above

(w) Which of the following is FALSE in C
(1) Keywords can be used as variable names
(2) Variable names can contain a digit
(3) Variable names do not contain a blank space
(4) Capital letters can be used in variable names

(x) In C, Arithmetic instruction cannot contain
(1) variables
(2) constants
(3) variable names on right side of =
(4) constants on left side of =

(y) Which of the following shows the correct hierarchy of arithmetic operations in C
(1) / + * -
(2) * - / +
(3) + - / *
(4) * / + -

(z) What will be the value of **d** if **d** is a float after the operation **d = 2 / 7.0**?
(1) 0
(2) 0.2857
(3) Cannot be determined
(4) None of the above

[H] Write C programs for the following:

(a) Ramesh's basic salary is input through the keyboard. His dearness allowance is 40% of basic salary, and house rent allowance is 20% of basic salary. Write a program to calculate his gross salary.

(b) The distance between two cities (in km.) is input through the keyboard. Write a program to convert and print this distance in meters, feet, inches and centimeters.

(c) If the marks obtained by a student in five different subjects are input through the keyboard, find out the aggregate marks and percentage marks obtained by the student. Assume that the maximum marks that can be obtained by a student in each subject is 100.

(d) Temperature of a city in Fahrenheit degrees is input through the keyboard. Write a program to convert this temperature into Centigrade degrees.

(e) The length & breadth of a rectangle and radius of a circle are input through the keyboard. Write a program to calculate the area & perimeter of the rectangle, and the area & circumference of the circle.

(f) Two numbers are input through the keyboard into two locations C and D. Write a program to interchange the contents of C and D.

(g) If a five-digit number is input through the keyboard, write a program to calculate the sum of its digits.

(Hint: Use the modulus operator '%')

(h) If a five-digit number is input through the keyboard, write a program to reverse the number.

(i) If a four-digit number is input through the keyboard, write a program to obtain the sum of the first and last digit of this number.

(j) In a town, the percentage of men is 52. The percentage of total literacy is 48. If total percentage of literate men is 35 of the total population, write a program to find the total number

of illiterate men and women if the population of the town is 80,000.

(k) A cashier has currency notes of denominations 10, 50 and 100. If the amount to be withdrawn is input through the keyboard in hundreds, find the total number of currency notes of each denomination the cashier will have to give to the withdrawer.

(l) If the total selling price of 15 items and the total profit earned on them is input through the keyboard, write a program to find the cost price of one item.

(m) If a five-digit number is input through the keyboard, write a program to print a new number by adding one to each of its digits. For example if the number that is input is 12391 then the output should be displayed as 23402.